

Electrostatic field variations related to the big Sumatra earthquake

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Electrical effects in correlation with earthquakes have been reported by many authors and different theories are discussed about the origin of these seismo-electrical effects. The actually most popular models consider piezoelectric effects, electro-kinetic effects, surface charge on crack wall, and rock/magma fragmentation as probable mechanism for the generation of electromagnetic emissions. Recently also laboratory experiments have been performed to study the mechanisms of rock fracturing, frictional sliding, and stick-slip phenomena. In this context our group has developed a method for monitoring of instable mountain flanks, which is presently tested at several sites. Here we report on extraordinary electrical signals, recorded by a station in Italy, that clearly corresponds to the $M_w=9.3$ earthquake of December 26, 2004, which occurred at 00:58:50.7 (UTC) “off the west coast of northern Sumatra, Indonesia” at 3.50° N, 95.72° E. Electrical monitoring with this method can be an additional tool for the global detection of very strong earthquakes. As this signals travel at the speed of light, the alert window will be significantly increased.